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10/711,792	10/06/2004	Wenchi Hsu	VIAP0120USA	5791
27765 7590 07/03/2007 NORTH AMERICA INTELLECTUAL PROPERTY CORPORATION P.O. BOX 506 MERRIFIELD, VA 22116			EXAMINER THAMMAVONG, PRASITH	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/711,792	Applicant(s) HSU, WENCHI	
	Examiner Prasith Thammavong	Art Unit 2187	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 April 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-12 is/are allowed.
- 6) ☒ Claim(s) 13-42 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 October 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

The Examiner acknowledges the applicant's submission of the amendment dated 4/10/07. At this point claims 1, 7, 13, 26, 29, and 39-40 have been amended. Thus, claims 1-42 are pending in the instant application.

The instant application having Application No. 10/711,792 has a total of 42 claims pending in the application, there are 4 independent claims and 38 dependent claims, all of which are ready for examination by the examiner.

1. INFORMATION CONCERNING OATH/DECLARATION

Oath/Declaration

The applicant's oath/declaration has been reviewed by the examiner and is found to conform to the requirements prescribed in 37 C.F.R. ' 1.63.

2. STATUS OF CLAIM FOR PRIORITY IN THE APPLICATION

As required by M.P.E.P. ' 201.14(c), acknowledgment is made of applicant's claim for priority based on an application 60/485,475 filed on 10/07/2003.

3. REJECTIONS BASED ON PRIOR ART

Claim Rejections - 35 USC ' 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. ' 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application

filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 13-17, 21-23, 27-28 are rejected under 35 U.S.C. 102(e) as being anticipated by Kadi (US PGPUB # 2004/0117556 A1).

With respect to claim 13, the Kadi reference teaches a pre-fetch controller for pre-fetching data from a memory for a logic operation unit, the pre-fetching controller comprising:

a register for storing a counter value; (paragraph 31, where the threshold value is stored in a register) and

a controller (paragraphs 32 and 33, the "third logic" and "first logic") electrically connected to the register for changing the counter value each time pre-fetching is activated and when a cache hit occurs. (paragraph 33, where the third logic increments/decrements the threshold value)

With respect to claim 14, the Kadi reference teaches the controller further comprises an operating unit for predicting a predetermined data required by the logic operation unit and pre-fetching the predetermined data from the memory when the pre-fetching is activated (paragraph 28, where the first logic checks if the data is in the prefetch buffer).

With respect to claim 15, the Kadi reference teaches the controller further comprises an output unit for decreasing the counter value by a first value when the pre-fetching is activated (paragraph 33, where when the threshold value is decremented for a miss).

With respect to claim 16, the Kadi reference teaches the controller further comprises a detecting unit for adding a second value to the counter value when the cache hit occurs (paragraph 33, where when the threshold value is incremented for a hit).

With respect to claim 17, the Kadi reference teaches the second value is an integer multiple of the first value. (paragraph 33, where the decrement value is an integer multiple of the increment value, i.e. $1 \times 1 = 1$).

With respect to claim 21, the Kadi reference teaches the controller further comprises an output unit for adding a third value to the counter value when the pre-fetching is activated. (paragraph 33, where the threshold value is incremented)

With respect to claim 22, the Kadi reference teaches the controller further comprises a detecting unit for subtracting a fourth value from the counter value when the cache hit occurs. (paragraph 33, where the threshold value is decremented)

With respect to claim 23, the Kadi reference teaches the fourth value is an integer multiple of the third value. (paragraph 33, where the decrement value is an integer multiple of the increment value, i.e. $1 \times 1 = 1$).

With respect to claim 27, the Kadi reference teaches teaches the pre-fetch controller further comprises a subtractor electrically connected to the register for changing the counter value. (paragraph 33, where the threshold value is decremented)

With respect to claim 28, the Kadi reference teaches the pre-fetch controller further comprises an adder electrically connected to the register for changing the counter value. (paragraph 33, where the threshold value is incremented)

Claim Rejections - 35 USC ' 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over of Kadi (US PG PUB # 2004/0117556 A1) in view of Kadowaki (US Patent # 6,654,873).

With respect to claim 18, the Kadi reference teaches the pre-fetch controller further comprises a comparing module electrically connected between the register and the controller for stopping pre-fetching data from the memory when the counter value becomes smaller than a first threshold value (paragraph 19, where the prefetching is stopped when the threshold value is less than the number of MP bits)

However, the Kadi reference does not teach restarting pre-fetching data from the memory when the counter value becomes larger than a second threshold value after the pre-fetching is stopped.

The Kadowaki reference teaches restarting pre-fetching data from the memory when the counter value becomes larger than a second threshold value after the pre-fetching is stopped (column 4, lines 62-65, where the prefetching is restarted from a suspended state).

The Kadi and Kadowaki references are analogous art because they are in the same field of endeavor of memory access and control.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the Kadi reference to restart pre-fetching data from the memory when the counter value becomes larger than a second threshold value after the pre-fetching is stopped, which is taught by the Kadowaki reference.

The suggestion/motivation for doing so would have been to increase processor efficiency (Kadowaki, column 1, line 63 to column 2, line 3).

Therefore it would have been obvious to combine the teachings of Kadi reference with the Kadowaki reference for the benefit of faster operations to obtain the invention as specified in claim 18.

With respect to claim 19, the Kadi reference teaches the counter value is blocked from being decreased by the first value when the pre-fetching is stopped (paragraph 32, where the prefetching is off, and there are no outstanding transactions), and the second value is added to the counter value when the pre-fetching is stopped and the cache hit occurs. (paragraph 32, where there could be outstanding transactions that could cause an increment).

Claims 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kadi (US PG PUB # 2004/0117556 A1) in view of Steely et al. (US Patent # 5,038,278) and Kadowaki (US Patent # 6,654,873).

With respect to claim 24, the Kadi reference does not explicitly teach the pre-fetch controller further comprises a comparing module electrically connected between the register and the controller for stopping pre-fetching data from the memory when the counter value becomes larger than a third threshold value and for restarting pre-fetching

data from the memory when the counter value becomes smaller than a fourth threshold value after the pre-fetching is stopped.

The Steely reference does teach implementing a counter to decrement when there is a hit versus to increment when there is a hit (column 4, lines 20-22). Therefore the combination of the Kadi and Steely references teach:

the pre-fetch controller further comprises a comparing module electrically connected between the register and the controller for stopping pre-fetching data from the memory when the counter value becomes larger than a third threshold value (Kadi, paragraph 19, where prefetching is not performed if the threshold value is less than [which could be substituted with greater than as suggested by the Steely reference] the number of the MP bits).

The Kadi and Steely references are analogous art because they are in the same field of endeavor of memory access and control.

The suggestion/motivation for doing so would have been to increase processor efficiency (Kadowaki, column 1, line 63 to column 2, line 3).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the Kadi reference for the pre-fetch controller further to comprise a comparing module electrically connected between the register and the controller for stopping pre-fetching data from the memory when the counter value becomes larger than a third threshold value.

However, the above combination of the Kadi and Steely reference does not explicitly teach restarting pre-fetching data from the memory when the counter value

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becomes smaller than a fourth threshold value after the pre-fetching is stopped.

The Kadowaki reference does teach restarting pre-fetching data from the memory when the counter value becomes smaller than a fourth threshold value after the pre-fetching is stopped. (Kadowaki, column 4, lines 62-65, where the prefetching is restarted from a suspended state).

The Kadi, Steely and Kadowaki references are analogous art because they are in the same field of endeavor of memory access and control.

The suggestion/motivation for doing so would have been to increase flexibility of the type of counter to use (Steely, column 4, lines 9-23).

Therefore it would have been obvious to combine the teachings of the combination of the Kadi and Steely references with the teachings of the Kadowaki reference for the benefit of increased prefetching to obtain the invention as specified in claim 24.

With respect to claim 25, the Kadi reference teaches the third value is blocked from being added to the counter value when the pre-fetching is stopped (paragraph 32, where the prefetching is off, and there are no outstanding transactions), and the fourth value is subtracted from the counter value when the pre-fetching is stopped and the cache hit occurs. (paragraph 32, where there could be outstanding transactions that could cause an decrement).

Claim 29-35, 37-38, and 41-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over of Kadi (US PGPUB # 2004/0117556 A1) in view of Kadowaki (US Patent # 6,654,873).

With respect to claim 29, the Kadi reference teaches a data processing device for pre-fetching data from a memory and providing data to a logic operation unit, the data processing device comprising:

a first memory for storing prediction data; (paragraph 28, the "prefetch buffer")

a second memory for storing data and providing the logic operation unit with data; (paragraph 28, the "data buffer")

a memory controller (paragraph 27, the "memory controller") electrically connected to the second memory for pre-fetching data from the second memory to the first memory; (paragraph 27, where the data is transferred from one memory to another) and

a pre-fetch controller (paragraph 32 and 33, the "first logic" and the third logic"), electrically connected between the second memory and the memory controller, for predicting a data required by the logic operating unit and controlling the memory controller to pre-fetch the data from the second memory, (paragraph 32, where the first logic determines which next cache line to get; and paragraph 33, where the third logic checks whether the requested data is in the prefetch buffer)

wherein the pre-fetch controller has a counter value (paragraph 33, the "threshold value") , compares the counter value with a first threshold value (paragraph 19, the "number of MP bits") to determine whether to stop a pre-fetching for data in the second memory (paragraph 19, where the comparison of the threshold value and number of MP bits determines on whether a prefetch is performed)

wherein the counter value is changed each time pre-fetching is performed and when a cache hit occurs. (paragraph 33, where the third logic increments/decrements the threshold value)

However, the Kadi reference does not teach comparing the counter value with a second threshold value to determine whether to restart pre-fetching data from the second memory after the pre-fetching is stopped.

The Kadowaki reference teaches comparing the counter value with a second threshold value to determine whether to restart pre-fetching data from the second memory after the pre-fetching is stopped (column 4, lines 62-65, where the prefetching is restarted from a suspended state).

The Kadi and Kadowaki references are analogous art because they are in the same field of endeavor of memory access and control.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the Kadi reference to compare the counter value with a second threshold value to determine whether to restart pre-fetching data from the second memory after the pre-fetching is stopped, which is taught by the Kadowaki reference.

The suggestion/motivation for doing so would have been to increase processor efficiency (Kadowaki, column 1, line 63 to column 2, line 3).

Therefore it would have been obvious to combine the teachings of Kadi reference with the Kadowaki reference for the benefit of faster operations to obtain the invention as specified in claim 29.

With respect to claim 30, the Kadi reference teaches the pre-fetching controller comprises:

a register for storing the counter value; (paragraph 31, where the threshold value is stored in a register).

and a comparing module electrically connected to the register for comparing the counter value with a first threshold value and a second threshold value. (paragraph 19, where the threshold value is compared to the number of MP bits)

With respect to claim 31, the Kadi reference teaches the pre-fetching controller further comprises a controller electrically connected to the comparing module for changing the counter value when the pre-fetching is activated and the cache hit occurs (paragraph 33, where the prefetching takes place and there is an increment when the requested data in the prefetch buffer).

With respect to claim 32, the Kadi reference teaches the controller comprises: an operating unit for predicting the data required by the logic operating unit and controlling the memory controller to fetch the data from the second memory; an output unit for sending a first command when the pre-fetching is activated; and a detecting unit for sending a second command when the cache hit occurs. (paragraph 28, where the data is forwarded to the data buffer; and paragraph 33, where the prefetching takes place and there is an increment/decrement when the requested data is in the prefetch buffer)

With respect to claim 33, the Kadi reference teaches the counter value is decreased by a first value when the pre-fetching is performed, and the counter value is

increased by a second value when the cache hit occurs. (paragraph 33, where when prefetching takes place, there is a decrement when there is a miss and an increment when there is a hit)

With respect to claim 34, the Kadi reference teaches the the second value is an integer multiple of the first value. (paragraph 33, where the decrement value is an integer multiple of the increment value, i.e. $1 \times 1 = 1$).

With respect to claim 35, the Kadi reference does not teach pre-fetching is stopped when the counter value becomes smaller than the first threshold value, and the pre-fetching is restarted when the counter value becomes larger than the second threshold value.

However, the Kadowaki reference does teach pre-fetching is stopped when the counter value becomes smaller than the first threshold value, and the pre-fetching is restarted when the counter value becomes larger than the second threshold value. (column 4, lines 62-65, where the prefetching is restarted from a suspended state)

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the Kadi reference to have the pre-fetching to be stopped when the counter value becomes smaller than the first threshold value, and the pre-fetching is restarted when the counter value becomes larger than the second threshold value, which is taught by the Kadowaki reference.

The suggestion/motivation for doing so would have been to increase processor efficiency (Kadowaki, column 1, line 63 to column 2, line 3).

Therefore it would have been obvious to combine the teachings of Kadi reference

with the Kadowaki reference for the benefit of faster operations to obtain the invention as specified in claim 35.

With respect to claim 37, the Kadi reference teaches a third value is added to the counter value when the pre-fetching is activated, and a fourth value is subtracted from the counter value when the cache hit occurs. (paragraph 33, where threshold value is incremented/decremented)

With respect to claim 38, the Kadi reference teaches the fourth value is an integer multiple of the third value. (paragraph 33, where the decrement value is an integer multiple of the increment value, i.e. $1 \times 1 = 1$).

With respect to claim 41, the Kadi reference teaches the data processing device further comprises an adder electrically connected to the register for increasing the counter value. (paragraph 33, where the threshold value is incremented)

With respect to claim 42, the Kadi reference teaches the data processing device further comprises a subtractor electrically connected to the register for decreasing the counter value by a first value or a second value. (paragraph 33, where the threshold value is decremented)

Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Kadi (US PG PUB # 2004/0117556 A1) and Kadowaki (US Patent # 6,654,873) as applied to claim 37 above, and further in view of Steely et al. (US Patent # 5,038,278).

With respect to claim 39, the combination of the Kadi and Kadowaki references does not explicitly teach pre-fetching data from the second memory is stopped when the

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counter value becomes larger than the third value, and pre-fetching data from the second memory is restarted when the counter value becomes smaller than the fourth value.

The Steely reference does teach implementing a counter to decrement when there is a hit versus to increment when there is a hit (column 4, lines 20-22). Therefore the combination of the Kadi, Kadowaki and Steely references teach:

pre-fetching data from the second memory is stopped when the counter value becomes larger than the third value (Kadi, paragraph 19, where prefetching is not performed if the threshold value is less than [which could be substituted with greater than as suggested by the Steely reference] the number of the MP bits), and

pre-fetching data from the second memory is restarted when the counter value becomes smaller than the fourth value (Kadowaki, column 4, lines 62-65, where the prefetching is restarted from a suspended state).

The Kadi, Kadowaki and Steely references are analogous art because they are in the same field of endeavor of memory access and control.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the combination of the Kadi and Kadowaki references to:

pre-fetching data from the second memory is stopped when the counter value becomes larger than the third value, and

pre-fetching data from the second memory is restarted when the counter value becomes smaller than the fourth value.

The suggestion/motivation for doing so would have been to increase flexibility of

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the type of counter to use. (Steely, column 4, lines 9-23)

Therefore it would have been obvious to combine the teachings of the combination of the Kadi and Kadowaki references with the teachings of the Steely reference for the benefit of flexibility to obtain the invention as specified in claim 39.

Claims 20 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Kadi (US PG PUB # 2004/0117556 A1) and Kadowaki (US Patent # 6,654,873) as applied to claims 18 and 35 above, and further in view of the Examiner's taking of Official Notice.

With respect to claims 20, and 36, the combination of the Kadi and Kadowaki references does not explicitly teach the second threshold value is larger than the first threshold value. However, the Kadi reference does teach that the number of MP bits is dynamic (paragraph 20). Therefore it was well known in the art at the time of the invention to have the second threshold value to be larger than the first threshold value and such Official Notice is taken. It would have been obvious to one of ordinary skill in the art to modify the Kadi and Kadowaki references to expand its teaching to have the second threshold value to be larger than the first threshold value in order to increase performance by allowing more prefetching and to decrease power consumption by reduce prefetching when additional prefetching is not needed, which is taught by the Kadi reference (paragraph 21).

Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Kadi (US PG PUB # 2004/0117556 A1), Kadowaki (US Patent # 6,654,873) and Steely et al. (US Patent # 5,038,278) as applied to claim 39 above, and

further in view of the Examiner's taking of Official Notice.

With respect to claim 40, the combination of the Kadi, Steely and Kadowaki references does not explicitly teach the fourth value is smaller than the third value. However, the Kadi reference does teach that the number of MP bits is dynamic (paragraph 20). Therefore it was well known in the art at the time of the invention to have the fourth value to be smaller than the third value and such Official Notice is taken. It would have been obvious to one of ordinary skill in the art to modify the combination of the Kadi, Steely and Kadowaki references to expand its teaching to have the fourth value to be smaller than the third value in order to increase performance by allowing more prefetching and to decrease power consumption by reduce prefetching when additional prefetching is not needed, which is taught by the Kadi reference (paragraph 21).

Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Kadi (US PG PUB # 2004/0117556 A1) in view of the Examiner's taking of Official Notice.

With respect to claim 26, the combination of the Kadi reference does not explicitly teach the fourth value is smaller than the third value. However, the Kadi reference does teach that the number of MP bits is dynamic (paragraph 20). Therefore it was well known in the art at the time of the invention to have the fourth value to be larger than the third value and such Official Notice is taken. It would have been obvious to one of ordinary skill in the art to modify the Kadi reference to expand its teaching to have the fourth threshold value to be smaller than the third threshold value in order to

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increase performance by allowing more prefetching and to decrease power consumption by reduce prefetching when additional prefetching is not needed, which is taught by the Kadi reference (paragraph 21).

4. ARGUMENTS CONCERNING NON-PRIOR ART REJECTIONS/OBJECTIONS

Oath/Declaration Objections

Applicant's arguments/amendments with respect to the Oath/Declaration have been considered and have overcome the Examiner's prior objections and thus are withdrawn.

Rejections - USC 101

Applicant's arguments/amendments with respect to claims 1-12 have been considered and have overcome the Examiner's prior rejections and thus are withdrawn.

Rejections - USC 112

Applicant's arguments/amendments with respect to claims 26, 39, and 40 have been considered and have overcome the Examiner's prior rejections and thus are withdrawn.

5. ARGUMENTS CONCERNING PRIOR ART REJECTIONS

Rejections - USC 102/103

Applicant's amendments/arguments with respect to claims 1-12 have been considered and are deemed persuasive. See Reasons for Allowance below for further explanation.

Applicant's amendments/arguments with respect to claims 13-42 have been considered and are not persuasive. See below for further explanation.

Applicant's Arguments pertaining to claim 13 on page 11, paragraph 2-3:

In contrast, Kadi teaches in paragraph [0033] that the threshold value is incremented for a cache hit and decremented for a miss. However, Kadi does not teach decrementing the threshold value each time pre-fetching is activated. This means that when a cache hit occurs, the threshold value is only incremented instead of being decreased and then increased as in the claimed invention. Therefore, Kadi does not teach all of the claimed steps contained in claim 1 and does not anticipate the currently amended claim 1.

Claim 13 has been amended to state that the controller changes the counter value each time pre-fetching is activated and when a cache hit occurs. As was stated with respect to claim 1, Kadi does not teach changing the threshold value each time pre-fetching is activated, and thus fails to anticipate the currently amended claim 13.

Applicant's arguments/amendments with respect to claim 13 have been considered but the Examiner respectfully disagrees. The Examiner contends that the limitation of "a controller electrically connected to the register for changing the counter value each time pre-fetching is activated and when a cache hit occurs" is not different from the prior art of record. As stated above in the rejection, the Kadi reference increments the value of the register when prefetching occurs and when there is a hit, as shown in paragraph 33.

Claim 1 recites "pre-fetching a predetermined data from the memory and subtracting a first value from the counter value each time pre-fetching is activated;" and "adding a second value to the counter value when a cache hit occurs", which is construed as the counter value is changed when both of these actions happen separately and independently. Unlike claim 1, claim 13 recites the limitation of "a controller electrically connected to the register for changing the counter value each time pre-fetching is activated and when a cache hit occurs" which can be construed as changing the counter value only when both of these actions occur together.

Applicant's Arguments pertaining to claims 18-19 on page 12, paragraph 4 - page

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13, paragraph 1:

Claim 4 recites the limitation "wherein when the pre-fetching is stopped and the counter value is larger than a second threshold value, pre-fetching data from the memory is restarted." Kadowaki teaches in column 4, lines 62-65 "Then, when the newly started processing of the "macro command" is completed, the sequence controller 22 immediately makes the prefetching and pre-decoding processing restart from the suspended state." However, Kadowaki does not teach or suggest the counter value being larger than a second threshold value before pre-fetching is restarted. Therefore, the prior art combination of Kadi and Kadowaki fails to teach all of the limitations contained in claim 4.

Similar to claim 4, claim 18 contains the limitations of "restarting pre-fetching data from the memory when the counter value becomes larger than a second threshold value after the pre-fetching is stopped". Since Kadowaki does not teach the counter value being larger than a second threshold value before pre-fetching is restarted, the cited prior art fails to teach all of the limitations contained in claim 4.

Claim 19, like claim 3, recites "the second value is added to the counter value when the pre-fetching is stopped and the cache hit occurs". However, as was stated with respect to claim 3, Kadi does not teach increasing the threshold value when pre-fetching is stopped. Thus, claim 19 is patentable over the cited prior art.

Applicant's arguments/amendments with respect to claim 18 have been considered but the Examiner respectfully disagrees. The Examiner contends that the Kadowaki reference teaches the limitation *"restarting pre-fetching data from the memory when the counter value becomes larger than a second threshold value after the pre-fetching is stopped"* in claim 18 as the Kadowaki reference teaches restarting prefetching after the counter surpasses a certain value, as evidenced in column 4, lines 37-65.

Applicant's arguments/amendments with respect to claim 19 have been considered but the Examiner respectfully disagrees. The Examiner contends that the Kadi reference teaches the limitation of *"the second value is added to the counter value when the pre-fetching is stopped and the cache hit occurs"* in claim 19 as the Kadi reference teaches that reference does teach even though prefetching is turned off, there could be outstanding transactions that could result in a hit as evidenced by paragraph 22 and 32.

Applicant's Arguments pertaining to claim 13 on page 11, paragraph 2-3:

Claim 29 has been amended to state that the "counter value is changed each time pre-fetching is performed and when a cache hit occurs". As was stated with respect to claim 13, Kadi does not teach changing the threshold value each time pre-fetching is activated, and thus fails to anticipate the currently amended claim 29.

Claim 35 recites "wherein the pre-fetching is stopped when the counter value becomes smaller than the first threshold value, and the pre-fetching is restarted when the counter value becomes larger than the second threshold value". As was stated with respect to claim 4, Kadowaki teaches in column 4, lines 62-65 "Then, when the newly started processing of the "macro command" is completed, the sequence controller 22 immediately makes the prefetching and pre-decoding processing restart from the suspended state." However, Kadowaki does not teach or suggest the counter value being larger than a second threshold value before pre-fetching is restarted. Therefore, the cited prior art fails to teach all of the limitations contained in claim 35.

Applicant's arguments/amendments with respect to claim 29 have been considered but the Examiner respectfully disagrees. Please see explanation above towards claim 13.

Applicant's arguments/amendments with respect to claim 35 have been considered but the Examiner respectfully disagrees. Please see explanation above towards claim 19.

Applicant's Arguments pertaining to dependent claims of 13 and 29:

Applicant's arguments/amendments with respect to claims 14-28 dependent on claim 13, and claims 30-42 dependent on claim 29 have been considered but the Examiner respectfully disagrees as their parent independent claims are still rejected as seen above.

6. REASONS FOR ALLOWANCE

The following is an examiner's statement of reasons for allowance:

Claim 1 recites the limitation of "pre-fetching a predetermined data from the memory and subtracting a first value from the counter value each time pre-fetching is

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activated.” This limitation is taught by the specification at least at page 5, paragraph 16. This limitation, in combination with other recites limitation of claim 1, is not taught or suggested by the prior art of record.

Claim 7 recites the limitation of “pre-fetching a predetermined data from the memory and adding a first value from the counter value each time pre-fetching is activated.” This limitation is taught by the specification at least at page 9, paragraph 26. This limitation, in combination with other recites limitation of claim 1, is not taught or suggested by the prior art of record.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

7. RELEVANT ART CITED BY THE EXAMINER

The following prior art made of record and not relied upon is cited to establish the level of skill in the applicant's art and those arts considered reasonably pertinent to applicant's disclosure. See **MPEP 707.05(c)**.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. These references include:

Shirahige et al. (US PG PUB # 20040003179 A1), which teaches a pre-fetch control device, data processing apparatus and pre-fetch control method;

Peterson et al. (US Patent # 6,792,524), which teaches a system and method cancelling a speculative branch;

Jang (US PG PUB # 2004/0148464 A1), which teaches a cache memory device and method of controlling the cache memory device; and

Shihadeh (US PG PUB # 20060224872 A1), which teaches a system for speculative branch prediction optimization and method thereof.

8. CLOSING COMMENTS

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

a. STATUS OF CLAIMS IN THE APPLICATION

The following is a summary of the treatment and status of all claims in the application as recommended by M.P.E.P. ' 707.07(i):

a(1) SUBJECT MATTER CONSIDERED ALLOWABLE

Claims 1-12 are considered allowable over the prior art of record.

a(4) CLAIMS REJECTED IN THE APPLICATION

Per the instant office action, claims 1-42 have received a first action on the merits and are subject of a first action non-final.

b. DIRECTION OF FUTURE CORRESPONDENCES


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Prasith Thammavong whose telephone number is (571) 270-1040 can normally be reached on Monday - Thursday 9:00am - 6:00pm and the first Friday of the bi-week, 9:00 am - 5:00 pm

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald Sparks can be reached on (571) 272-4201. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Prasith Thammavong
Patent Examiner
Art Unit 2187
June 22, 2007



DONALD SPARKS
SUPERVISORY PATENT EXAMINER